

Project Fact Sheet

Development of an Extended Induction Logging Tool for Geothermal Exploration and Field Development

GOALS

- To design, manufacture and field test an extended induction geophysical logging device for geothermal applications in California and elsewhere.
- To develop software for three dimensional imaging and fracture delineation from both crosswell and single-well investigations.



PROJECT DESCRIPTION

Exploration and drilling costs represent the highest costs involved in developing geothermal resources--as much as fifty percent of the total costs. Due to a lack of information about the underground resource, exploration drilling often results in dry wells or low-production wells, at great expense to the developer.

This project involved the design, manufacture, and field testing of an innovative geophysical instrument for three-dimensional subsurface imaging. The Geothermal Borehole Induction Logging Tool (GeoBILT) is inserted into an existing geothermal well and collects data that is used to understand and map the geothermal resource.

The new tool provides capabilities that are presently unavailable with commercial logging systems, which were developed for the oil and gas industries. GeoBILT is able to operate at temperatures up to 260 degrees C and depths up to 4 km. It achieves this by means of innovative insulation and heat dissipation devices. The tool also features a three-component borehole transmitter and a three-component variable offset receiver for collecting nine component "vector" data sets. These are needed for delineating off-axis structure fractures and reservoir inhomogeneities. It also allows for geophysical logging in highly deviated or horizontal boreholes.

Interpreting the geophysical logs obtained with GeoBILT requires the application of computer models and software capable of three-dimensional data inversion. The final software product includes both a simple processing algorithm for 1-dimensional analysis and model simulation, and a more sophisticated package for detailed reservoir modeling and data inversion.



BENEFITS TO CALIFORNIA

The potential benefits the GeoBILT tool to California's geothermal industry (as well as the oil and gas industries) are significant. The new tool is more powerful, versatile, reliable and easier to use than its predecessor. It provides a significant aid in field characterization for exploration, development and enhancement. GeoBILT is expected to reduce the expense associated with the drilling of exploration wells by approximately 20%.

No other commercial tool is capable of operating within the geothermal environment, providing three-dimensional subsurface information, and interpreting the complex geology typical of geothermal resource areas.

FUNDING AMOUNT

Commission	\$1,380,709
Match Funding	\$1,407,957 (USDOE and EMI)

PROJECT STATUS

Completed.

FOR MORE INFORMATION

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